

In the Claims

This listing of claims will replace all prior versions and listings of claims in this application.

1 (Currently amended). ~~[[A]]~~ An isolated polynucleotide selected from the group consisting of:

- (a) ~~polynucleotides~~ a polynucleotide encoding at least ~~[[the]]~~ a mature form of ~~[[the]]~~ a polypeptide having ~~[[the]]~~ a deduced amino acid sequence as shown in SEQ ID NO: ~~1~~ 2;
- (b) ~~polynucleotides~~ a polynucleotide having ~~[[the]]~~ a coding sequence, as shown in SEQ ID NO: ~~2~~ 1 encoding at least ~~[[the]]~~ a mature form of the polypeptide;
- (c) ~~polynucleotides~~ a polynucleotide encoding a fragment or derivative of a polypeptide encoded by a polynucleotide of any one of (a) to (b), wherein in said derivative one or more amino acid residues are conservatively substituted compared to said polypeptide, and said fragment or derivative has bitter substance binding activity;
- (d) ~~polynucleotides~~ a polynucleotide which ~~[[are]]~~ is at least 50% identical to a polynucleotide as defined in any one of (a) to (c) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity; and
- (e) ~~polynucleotides~~ a polynucleotide the complementary strand of which hybridizes, ~~preferably under stringent~~ under moderate hybridization conditions to a polynucleotide as defined in any one of (a) to (d) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity;

or the complementary strand of such a polynucleotide.

2 (Currently amended). The isolated polynucleotide of claim 1 which is DNA, genomic DNA or RNA.

3 (Currently amended). A vector comprising a polynucleotide selected from the group consisting of:

- (a) ~~polynucleotides~~ a polynucleotide encoding at least ~~[[the]]~~ a mature form of ~~[[the]]~~ a polypeptide having ~~[[the]]~~ a deduced amino acid sequence as shown in SEQ ID NO: ~~1~~ 2;

- (b) ~~polynucleotides~~ a polynucleotide having ~~[[the]]~~ a coding sequence, as shown in SEQ ID NO: ~~[[1]]~~2 encoding at least ~~[[the]]~~ a mature form of the polypeptide;
  - (c) ~~polynucleotides~~ a polynucleotide encoding a fragment or derivative of a polypeptide encoded by a polynucleotide of any one of (a) to (b), wherein in said derivative one or more amino acid residues are conservatively substituted compared to said polypeptide, and said fragment or derivative has bitter substance binding activity;
  - (d) ~~polynucleotides~~ a polynucleotide which ~~[[are]]~~ is at least 50% identical to a polynucleotide as defined in any one of (a) to (c) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity; and
  - (e) ~~polynucleotides~~ a polynucleotide the complementary strand of which hybridizes, ~~preferably under stringent~~ under moderate hybridization conditions to a polynucleotide as defined in any one of (a) to (d) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity;
- or the complementary strand of such a polynucleotide.

4 (Original). The vector of claim 3 in which the polynucleotide is operatively linked to expression control sequences allowing expression in prokaryotic and/or eukaryotic host cells.

5 (Currently amended). A host cell genetically engineered to comprise a polynucleotide selected from the group consisting of:

- (a) ~~polynucleotides~~ a polynucleotide encoding at least ~~[[the]]~~ a mature form of ~~[[the]]~~ a polypeptide having ~~[[the]]~~ a deduced amino acid sequence as shown in SEQ ID NO: ~~[[2]]~~1;
- (b) ~~polynucleotides~~ a polynucleotide having ~~[[the]]~~ a coding sequence, as shown in SEQ ID NO: ~~[[1]]~~2 encoding at least ~~[[the]]~~ a mature form of the polypeptide;
- (c) ~~polynucleotides~~ a polynucleotide encoding a fragment or derivative of a polypeptide encoded by a polynucleotide of any one of (a) to (b), wherein in said derivative one or more amino acid residues are conservatively substituted compared to said polypeptide, and said fragment or derivative has bitter substance binding activity;

- (d) ~~polynucleotides~~ a polynucleotide which ~~[[are]]~~ is at least 50% identical to a polynucleotide as defined in any one of (a) to (c) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity; and
- (e) ~~polynucleotides~~ a polynucleotide the complementary strand of which hybridizes, ~~preferably under stringent~~ under moderate hybridization conditions to a polynucleotide as defined in any one of (a) to (d) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity;
- or the complementary strand of such a polynucleotide.

6 (Cancelled).

7 (Currently amended). A process for producing a polypeptide encoded by ~~[[a]]~~ an isolated polynucleotide selected from the group consisting of:

- (a) ~~polynucleotides~~ a polynucleotide encoding at least ~~[[the]]~~ a mature form of ~~[[the]]~~ a polypeptide having ~~[[the]]~~ a deduced amino acid sequence as shown in SEQ ID NO: ~~[[2]]~~ 1;
- (b) ~~polynucleotides~~ a polynucleotide having ~~[[the]]~~ a coding sequence, as shown in SEQ ID NO: ~~[[1]]~~ 2 encoding at least ~~[[the]]~~ a mature form of the polypeptide;
- (c) ~~polynucleotides~~ a polynucleotide encoding a fragment or derivative of a polypeptide encoded by a polynucleotide of any one of (a) to (b), wherein in said derivative one or more amino acid residues are conservatively substituted compared to said polypeptide, and said fragment or derivative has bitter substance binding activity;
- (d) ~~polynucleotides~~ a polynucleotide which ~~[[are]]~~ is at least 50% identical to a polynucleotide as defined in any one of (a) to (c) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity; and
- (e) ~~polynucleotides~~ a polynucleotide the complementary strand of which hybridizes, ~~preferably under stringent~~ under moderate hybridization conditions to a polynucleotide as defined in any one of (a) to (d) and which ~~[[code]]~~ codes for a polypeptide having bitter substance

binding activity;  
~~or the complementary strand of such a polynucleotide;~~  
 wherein said process comprises culturing a host cell comprising said isolated polynucleotide and recovering the polypeptide encoded by said isolated polynucleotide.

8 (Cancelled).

9 (Currently amended). ~~[[A]]~~ An isolated polypeptide having the amino acid sequence encoded by a polynucleotide selected from the group consisting of:

- (a) ~~polynucleotides~~ a polynucleotide encoding at least ~~[[the]]~~ a mature form of ~~[[the]]~~ a polypeptide having ~~[[the]]~~ a deduced amino acid sequence as shown in SEQ ID NO: ~~[[2]]~~ 1;
  - (b) ~~polynucleotides~~ a polynucleotide having ~~[[the]]~~ a coding sequence, as shown in SEQ ID NO: ~~[[1]]~~ 2 encoding at least ~~[[the]]~~ a mature form of the polypeptide;
  - (c) ~~polynucleotides~~ a polynucleotide encoding a fragment or derivative of a polypeptide encoded by a polynucleotide of any one of (a) to (b), wherein in said derivative one or more amino acid residues are conservatively substituted compared to said polypeptide, and said fragment or derivative has bitter substance binding activity;
  - (d) ~~polynucleotides~~ a polynucleotide which ~~[[are]]~~ is at least 50% identical to a polynucleotide as defined in any one of (a) to (c) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity; and
  - (e) ~~polynucleotides~~ a polynucleotide the complementary strand of which hybridizes, ~~preferably under stringent~~ under moderate hybridization conditions to a polynucleotide as defined in any one of (a) to (d) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity;
- ~~or the complementary strand of such a polynucleotide;~~ or that is obtainable by culturing a host cell comprising said polynucleotide and recovering the polypeptide encoded by said polynucleotide.

10 - 11 (Cancelled).

12 (Currently amended). An antagonist/inhibitor against a polypeptide having the amino acid sequence encoded by a polynucleotide selected from the group consisting of:

- (a) ~~polynucleotides~~ a polynucleotide encoding at least ~~[[the]]~~ a mature form of ~~[[the]]~~ a polypeptide having ~~[[the]]~~ a deduced amino acid sequence as shown in SEQ ID NO: ~~[[2]]~~ 1;
  - (b) ~~polynucleotides~~ a polynucleotide having ~~[[the]]~~ a coding sequence, as shown in SEQ ID NO: ~~[[1]]~~ 2 encoding at least ~~[[the]]~~ a mature form of the polypeptide;
  - (c) ~~polynucleotides~~ a polynucleotide encoding a fragment or derivative of a polypeptide encoded by a polynucleotide of any one of (a) to (b), wherein in said derivative one or more amino acid residues are conservatively substituted compared to said polypeptide, and said fragment or derivative has bitter substance binding activity;
  - (d) ~~polynucleotides~~ a polynucleotide which ~~[[are]]~~ is at least 50% identical to a polynucleotide as defined in any one of (a) to (c) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity; and
  - (e) ~~polynucleotides~~ a polynucleotide the complementary strand of which hybridizes, ~~preferably under stringent~~ under moderate hybridization conditions to a polynucleotide as defined in any one of (a) to (d) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity;
- ~~or the complementary strand of such a polynucleotide;~~
- or that is obtainable by culturing a host cell comprising said polynucleotide and recovering the polypeptide encoded by said polynucleotide;
- wherein said antagonist/inhibitor is ~~an antibody~~, the extracellular domain of said polypeptide or a fragment thereof, ~~or an inhibiting RNA~~.

13 (Cancelled).

14 (currently amended). A process for isolating a compound that binds to a polypeptide encoded by a polynucleotide selected from the group consisting of:

- (a) ~~polynucleotides~~ a polynucleotide encoding at least ~~[[the]]~~ a mature form of ~~[[the]]~~ a polypeptide having ~~[[the]]~~ a deduced amino acid sequence as shown in SEQ ID NO: ~~[[2]]~~ 1;
- (b) ~~polynucleotides~~ a polynucleotide having ~~[[the]]~~ a coding sequence, as shown in SEQ ID NO: ~~[[1]]~~ 2 encoding at least ~~[[the]]~~ a mature form of the polypeptide;
- (c) ~~polynucleotides~~ a polynucleotide encoding a fragment or derivative of a polypeptide encoded by a polynucleotide of any one of (a) to (b), wherein in said derivative one or more amino acid residues are conservatively substituted compared to said polypeptide, and said fragment or derivative has bitter substance binding activity;
- (d) ~~polynucleotides~~ a polynucleotide which ~~[[are]]~~ is at least 50% identical to a polynucleotide as defined in any one of (a) to (c) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity; and
- (e) ~~polynucleotides~~ a polynucleotide the complementary strand of which hybridizes, ~~preferably under stringent~~ under moderate hybridization conditions to a polynucleotide as defined in any one of (a) to (d) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity;

wherein said process comprises:

- (1) contacting said polypeptide, or a host cell genetically engineered with said polynucleotide or with a vector containing said polynucleotide, with a compound;
- (2) detecting the presence of the compound which binds to said polypeptide; and
- (3) determining whether the compound binds said polypeptide.

15 (Currently amended). A process for isolating an antagonist of the bitter taste receptor activity of the polypeptide encoded by a polynucleotide selected from the group consisting of:

- (a) ~~polynucleotides~~ a polynucleotide encoding at least ~~[[the]]~~ a mature form of ~~[[the]]~~ a polypeptide having ~~[[the]]~~ a deduced amino acid sequence as shown in SEQ ID NO: ~~[[2]]~~ 1;
- (b) ~~polynucleotides~~ a polynucleotide having ~~[[the]]~~ a coding sequence, as shown in SEQ ID

NO:12 encoding at least the a mature form of the polypeptide;

- (c) ~~polynucleotides~~ a polynucleotide encoding a fragment or derivative of a polypeptide encoded by a polynucleotide of any one of (a) to (b), wherein in said derivative one or more amino acid residues are conservatively substituted compared to said polypeptide, and said fragment or derivative has bitter taste receptor activity;
- (d) ~~polynucleotides~~ a polynucleotide which ~~is~~ is at least 50% identical to a polynucleotide as defined in any one of (a) to (c) and which ~~code~~ codes for a polypeptide having bitter taste receptor activity; and
- (e) ~~polynucleotides~~ a polynucleotide the complementary strand of which hybridizes, ~~preferably under stringent~~ under moderate hybridization conditions to a polynucleotide as defined in any one of (a) to (d) and which ~~code~~ codes for a polypeptide having bitter taste receptor activity;

wherein said process comprises:

- (1) contacting said polypeptide, or a host cell genetically engineered with said polynucleotide or with a vector containing said polynucleotide, with a potential antagonist;
- (2) determining whether the potential antagonist antagonizes the bitter taste receptor activity of said polypeptide.

16 (Original). The process of claim 15 further comprising the contacting of the polypeptide with an agonist of the respective bitter taste receptor activity.

17 (Original). The process of claim 16 in which said contacting with an agonist is carried out prior, concomitantly or after step (1) of claim 15.

18 (Original). The process of claim 16 in which said polypeptide and said agonist are selected from the group consisting of:

- (a) the polypeptide encoded by the polynucleotide of claim 1 as determined by SEQ ID NO: 1 and SEQ ID NO: 2 and the agonist selected from the group consisting of acetylthiourea,

N,N-dimethylthioformamide, N,N'-diphenylthiourea, N-ethylthiourea, 2-imidazolidinethione, 4(6)-methyl-2-thiouracil, N-methylthiourea, phenylthiocarbamid, 6-phenyl-2-thiouracil, 6-propyl-2-thiouracil, tetramethylthiourea, thioacetamide, thioacetanilide, 2-thiobarbituric acid, and 2-thiouracil and functional derivatives thereof.

19 (Currently amended). A process selected from the group consisting of:

A. a process for the production of a food or any precursor material or additive employed in the production of foodstuffs comprising the steps of either

(i) isolating a compound that binds to ~~[[a]]~~ an isolated polypeptide encoded by ~~[[a]]~~ an isolated polynucleotide selected from the group consisting of:

(a) ~~polynucleotides~~ a polynucleotide encoding at least ~~[[the]]~~ a mature form of ~~[[the]]~~ a polypeptide having ~~[[the]]~~ a deduced amino acid sequence as shown in SEQ ID NO:~~[[2]]~~ 1;

(b) ~~polynucleotides~~ a polynucleotide having ~~[[the]]~~ a coding sequence, as shown in SEQ ID NO:~~[[1]]~~ 2 encoding at least ~~[[the]]~~ a mature form of the polypeptide;

(c) ~~polynucleotides~~ a polynucleotide encoding a fragment or derivative of a polypeptide encoded by a polynucleotide of any one of (a) to (b), wherein in said derivative one or more amino acid residues are conservatively substituted compared to said polypeptide, and said fragment or derivative has bitter substance binding activity;

(d) ~~polynucleotides~~ a polynucleotide which ~~[[are]]~~ is at least 50% identical to a polynucleotide as defined in any one of (a) to (c) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity; and

(e) ~~polynucleotides~~ a polynucleotide the complementary strand of which hybridizes, ~~preferably under stringent~~ under moderate hybridization conditions to a polynucleotide as defined in any one of (a) to (d) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity;

wherein said isolating step further comprises:

(1) contacting said isolated polypeptide, or a host cell genetically engineered with said isolated polynucleotide or with a vector containing said isolated polynucleotide, with a compound;



(2) detecting the presence of the compound which binds to said polypeptide; and

(3) determining whether the compound binds said polypeptide;

or

(ii) isolating an antagonist of the bitter taste receptor activity of ~~[[the]]~~ an isolated polypeptide encoded by ~~[[a]]~~ an isolated polynucleotide selected from the group consisting of:

(a) ~~polynucleotides~~ a polynucleotide encoding at least ~~[[the]]~~ a mature form of ~~[[the]]~~ a polypeptide having ~~[[the]]~~ a deduced amino acid sequence as shown in SEQ ID NO: ~~[[2]]~~ 1;

(b) ~~polynucleotides~~ a polynucleotide having ~~[[the]]~~ a coding sequence, as shown in SEQ ID NO: ~~[[1]]~~ 2 encoding at least ~~[[the]]~~ a mature form of the polypeptide;

(c) ~~polynucleotides~~ a polynucleotide encoding a fragment or derivative of a polypeptide encoded by a polynucleotide of any one of (a) to (b), wherein in said derivative one or more amino acid residues are conservatively substituted compared to said polypeptide, and said fragment or derivative has bitter taste receptor activity;

(d) ~~polynucleotides~~ a polynucleotide which ~~[[are]]~~ is at least 50% identical to a polynucleotide as defined in any one of (a) to (c) and which ~~[[code]]~~ codes for a polypeptide having bitter taste receptor activity; and

(e) ~~polynucleotides~~ a polynucleotide the complementary strand of which hybridizes, ~~preferably under stringent~~ under moderate hybridization conditions to a polynucleotide as defined in any one of (a) to (d) and which ~~[[code]]~~ codes for a polypeptide having bitter taste receptor activity;

wherein said isolating step further comprises:

(1) contacting said isolated polypeptide, or a host cell genetically engineered with said isolated polynucleotide or with a vector containing said isolated polynucleotide, with a potential antagonist; and

(2) determining whether the potential antagonist antagonizes the bitter taste receptor activity of said polypeptide;

and wherein the process further comprises the subsequent step of admixing the identified compound or

antagonist with foodstuffs or any precursor material or additive employed in the production of foodstuffs; and

B. a process for the production of a nutraceutical or pharmaceutical composition comprising the steps of either

(i) isolating a compound that binds to ~~[[a]]~~ an isolated polypeptide encoded by ~~[[a]]~~ an isolated polynucleotide selected from the group consisting of:

(a) ~~polynucleotides~~ a polynucleotide encoding at least ~~[[the]]~~ a mature form of ~~[[the]]~~ a polypeptide having ~~[[the]]~~ a deduced amino acid sequence as shown in SEQ ID NO: ~~[[2]]~~ 1;

(b) ~~polynucleotides~~ a polynucleotide having ~~[[the]]~~ a coding sequence, as shown in SEQ ID NO: ~~[[1]]~~ 2 encoding at least ~~[[the]]~~ a mature form of the polypeptide;

(c) ~~polynucleotides~~ a polynucleotide encoding a fragment or derivative of a polypeptide encoded by a polynucleotide of any one of (a) to (b), wherein in said derivative one or more amino acid residues are conservatively substituted compared to said polypeptide, and said fragment or derivative has bitter substance binding activity;

(d) ~~polynucleotides~~ a polynucleotide which ~~[[are]]~~ is at least 50% identical to a polynucleotide as defined in any one of (a) to (c) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity; and

(e) ~~polynucleotides~~ a polynucleotide the complementary strand of which hybridizes, ~~preferably under stringent~~ under moderate hybridization conditions to a polynucleotide as defined in any one of (a) to (d) and which ~~[[code]]~~ codes for a polypeptide having bitter substance binding activity;

wherein said isolating step further comprises:

(1) contacting said isolated polypeptide, or a host cell genetically engineered with said isolated polynucleotide or with a vector containing said isolated polynucleotide, with a compound;

(2) detecting the presence of the compound which binds to said polypeptide; and

(3) determining whether the compound binds said polypeptide;

or

(ii) isolating an antagonist of the bitter taste receptor activity of ~~[[the]]~~ an isolated polypeptide

encoded by ~~[[a]]~~ an isolated polynucleotide selected from the group consisting of:

- (a) ~~polynucleotides~~ a polynucleotide encoding at least ~~[[the]]~~ a mature form of ~~[[the]]~~ a polypeptide having ~~[[the]]~~ a deduced amino acid sequence as shown in SEQ ID NO:~~[[2]]~~1;
- (b) ~~polynucleotides~~ a polynucleotide having ~~[[the]]~~ a coding sequence, as shown in SEQ ID NO:~~[[1]]~~2 encoding at least ~~[[the]]~~ a mature form of the polypeptide;
- (c) ~~polynucleotides~~ a polynucleotide encoding a fragment or derivative of a polypeptide encoded by a polynucleotide of any one of (a) to (b), wherein in said derivative one or more amino acid residues are conservatively substituted compared to said polypeptide, and said fragment or derivative has bitter taste receptor activity;
- (d) ~~polynucleotides~~ a polynucleotide which ~~[[are]]~~ is at least 50% identical to a polynucleotide as defined in any one of (a) to (c) and which ~~[[code]]~~ codes for a polypeptide having bitter taste receptor activity; and
- (e) ~~polynucleotides~~ a polynucleotide the complementary strand of which hybridizes, ~~preferably under stringent~~ under moderate hybridization conditions to a polynucleotide as defined in any one of (a) to (d) and which ~~[[code]]~~ codes for a polypeptide having bitter taste receptor activity;

wherein said isolating step further comprises:

- (1) contacting said isolated polypeptide, or a host cell genetically engineered with said isolated polynucleotide or with a vector containing said isolated polynucleotide, with a potential antagonist; and
- (2) determining whether the potential antagonist antagonizes the bitter taste receptor activity of said polypeptide;

and wherein the process further comprises the subsequent step of formulating the compound or antagonist with an active agent in a pharmaceutically acceptable form.

20- 24 (Cancelled).